

### **Listing of Claims**

This Listing of Claims will replace all prior versions and Listings of Claims in the application:

1. (Currently Amended) A method for ~~aggregating data from maintaining aggregations of values contained by fields of multiple database records in order to summarize information about multiple instances of an organizational activity, wherein each of the multiple database records corresponds to one of the multiple organizational activity instances, wherein data within each of the multiple database records reflects an attribute of the organizational activity instance corresponding to that record, and wherein the method is performed by a plurality of program threads in at least one computer, comprising:~~

~~creating at least one aggregation table representing multiple partitions~~aggregation groups, each ~~partition group~~including a plurality of aggregation records, each aggregation record including an ~~aggregation~~ ~~a~~value representing ~~for an aggregation of values contained by fields of a distinct subset of the multiple database records;~~

~~selecting a first of the multiple partitions~~ ~~aggregation group~~upon insertion or update of a first of the multiple database records, wherein said selecting is initiated in response to a request by a first of the plurality of program threads to access one of the multiple partitions;

~~updating the aggregation value in at least one of the aggregation records in the first partition, wherein the updating is performed by the first program thread as part of a first partition update transaction, and wherein the first partition update transaction is revising, based on one or more values within the inserted or updated first database record and as part of a first aggregation group update transaction, the aggregation value of one of the aggregation records of the first aggregation group;~~

~~preventing other program threads from accessing subsequent selection of the first partition aggregation group until the first program thread no longer requires access to the first partition aggregation group update transaction is completed;~~

~~selecting a second partition, while the first partition aggregation group update transaction is being performed, wherein said selecting is initiated in response to a request by a second of the plurality of program threads to access one of the multiple partitions and upon insertion or update of a second of the multiple database records, a second aggregation group; and~~

updating the aggregation value in at least one of the aggregation records in the second partition, wherein the updating is performed by the second program thread as part of a second partition update transaction, wherein the second partition update transaction is revising, based on one or more values within the inserted or updated second database record, and wherein the second partition update transaction is performed during performance of the first partition aggregation group update transaction, the aggregation value of one of the aggregation records of the second; and aggregation group.

aggregating aggregation values from the multiple partitions and outputting said aggregated aggregation values as a part of a summary of the multiple organizational activity instances.

2. (Currently Amended) The method of claim 1, wherein each of the multiple partitions aggregation group is represented in a separate aggregation partition of a multi-partition aggregation table.

3. (Currently Amended) The method of claim 1, further comprising:  
selecting a third partition aggregation group upon initiation of a subsequent transaction to update the first of the multiple database records; and  
revising, based on one or more values within the subsequently updated first database record, the aggregation value of an aggregation record of the third partition aggregation group.

4. (Currently Amended) The method of claim 1, wherein the step of aggregating aggregation values comprises further comprising:

combining the multiple partitions aggregation groups into a single table of aggregation records, each record of the single table aggregating values of an aggregation record from each of the multiple partitions aggregation groups.

5. (Currently Amended) The method of claim 1, wherein said creating at least one aggregation table multiple aggregation groups comprises creating at least three partitions aggregation groups.

6. (Currently Amended) The method of claim 1, wherein said creating at least one aggregation table ~~multiple aggregation groups~~ comprises creating at least ten ~~partitions~~aggregation groups.

7. (Currently Amended) The method of claim 1, wherein the steps of the method are performed on a computer with at least one processor, and wherein said creating at least one aggregation table ~~multiple aggregation groups~~ comprises creating a number of partitions greater than the aggregation groups, and wherein said number exceeds a number of processors in said a computer used to perform the steps of claim 1.

8. (Cancelled)

9. (Currently Amended) The method of claim ~~1~~8, further comprising:  
determining, upon receiving a request from the first ~~a~~ program thread for access to a partition~~an aggregation group~~, a system identifier for the first ~~requesting~~ program thread; and  
assigning a partition ~~an aggregation group~~ identifier to the first ~~requesting~~ program thread based on the determined system identifier.

10. (Currently Amended) The method of claim 1, wherein:  
~~each of the multiple database records corresponds to an instance of an organizational activity,~~  
each of the multiple database records includes a field having a value indicating the corresponding instance to be in one of several process states, and  
~~each partition aggregation group includes time-sorted aggregation records, each time-sorted aggregation record containing an aggregation value for instances in one of the several process states during a time period associated with the time-sorted aggregation record.~~

11. (Currently Amended) The method of claim 10, wherein one of said several process states comprises an instance being completed, and further comprising:

~~revising the deleting-aggregation values of the time-sorted aggregation records so as to~~  
~~exclude from said revised values the effects of records corresponding to instances completed~~  
~~outside of a preselected time window.~~

12. (Cancelled)

13. (Currently Amended) The method of claim ~~10, 12~~, further comprising:  
~~deleting an aggregation record records from a partition the aggregated data table~~  
~~subsequent to a determination that indicating none of the multiple database records associated~~  
~~with said partition instances were in one of the process states during a time period corresponding~~  
~~to the deleted aggregation record.~~

14. (Cancelled)

15. (Currently Amended) The method of claim ~~10, 12~~, wherein the one of the process  
states corresponds to an instance being completed and wherein each of the multiple database  
~~records plurality of records~~ includes a completion time field; and further comprising:

assigning a null value to the completion time field for database records corresponding to  
instances that are not completed;

assigning a non-null value to the completion time field for database records  
corresponding to instances in the completed process state.

16. (Currently Amended) The method of claim 15, ~~wherein data for each instance is~~  
~~maintained in an associated record of an instances data table, and further comprising:~~

determining if a record of the multiple database records of the instances data table has  
been updated;

revising, upon determining that the database instances data table record has been updated  
and based on said update, an ~~aggregated aggregation~~ value of one of the plurality of aggregation  
records;

further determining whether the updated ~~database instances data table~~ record contains a value indicating the ~~corresponding associated~~ instance is in the completed process state;  
generating, upon determining that the ~~corresponding associated~~ instance is in the completed process state, a time of completion value for the instance; and  
updating ~~the one of the plurality of aggregation records a record of the aggregated data table~~ based on the time of completion value for the instance.

17. (Cancelled)

18. (Currently Amended) A computer-readable storage medium having stored thereon data representing sequences of instructions which, when executed by a processor, cause the processor to perform a method for aggregating data from multiple database records in order to summarize information about multiple instances of an organizational activity, wherein each of the multiple database records corresponds to one of the multiple organizational activity instances, wherein data within each of the multiple database records reflects an attribute of the organizational activity instance corresponding to that record, and wherein the method is performed by a plurality of program threads in at least one computer, the instructions steps comprising:

instructions for creating at least one aggregation table representing multiple partitions~~aggregation groups~~, each partition group including a plurality of aggregation records, each aggregation record including a value for an aggregation of values contained by fields of a distinct subset of multiple database records;

instructions for selecting a first of the multiple partitions ~~aggregation group~~ upon insertion or update of a first of the multiple database records, wherein said selecting is initiated in response to a request by a first of the plurality of program threads to access one of the multiple partitions;

instructions for updating the aggregation value in at least one of the aggregation records in the first partition, wherein the updating is performed by the first program thread as part of a first partition update transaction, and wherein the first partition update transaction is ~~revising,~~ based on one or more values within the inserted or updated first database record ~~and as part of a~~

~~first aggregation group update transaction, the aggregation value of one of the aggregation records of the first aggregation group;~~

~~instructions for preventing other program threads from accessing subsequent selection of the first partition aggregation group until the first program thread no longer requires access to the first partition aggregation group update transaction is completed;~~

~~instructions for selecting a second partition, while the first partition aggregation group update transaction is being performed, wherein said selecting is initiated in response to a request by a second of the plurality of program threads to access one of the multiple partitions and upon insertion or update of a second of the multiple database records, a second aggregation group; and~~

~~instructions for updating the aggregation value in at least one of the aggregation records in the second partition, wherein the updating is performed by the second program thread as part of a second partition update transaction, wherein the second partition update transaction is revising, based on one or more values within the inserted or updated second database record, and wherein the second partition update transaction is performed during performance of the first partition aggregation group update transaction, the aggregation value of one of the aggregation records of the second; and aggregation group.~~

~~instructions for aggregating aggregation values from the multiple partitions and outputting said aggregated aggregation values as a part of a summary of the multiple organizational activity instances.~~

19. (Currently Amended) The computer-readable storage medium of claim 18, wherein each of the multiple partitions ~~aggregation group~~ is represented in a separate aggregation partition of a multi-partition aggregation table.

20. (Currently Amended) The computer-readable storage medium of claim 18, further comprising further instructions for performing steps comprising:

instructions for selecting a third partition aggregation group upon initiation of a subsequent transaction to update the first of the multiple database records; and

instructions for revising, based on one or more values within the subsequently updated first database record, the aggregation value of an aggregation record of the third partition~~aggregation group~~.

21. (Currently Amended) The computer-readable storage medium of claim 18, ~~comprising further instructions for performing steps comprising: wherein aggregating~~ aggregation values comprises combining the multiple partitions ~~aggregation groups into a single~~ table of aggregation records, each record of the single table aggregating values of an aggregation record from each of the multiple partitions~~aggregation groups~~.

22. (Currently Amended) The computer-readable storage medium of claim 18, wherein said creating at least one aggregation table ~~multiple aggregation groups~~ comprises creating at least three partitions~~aggregation groups~~.

23. (Currently Amended) The computer-readable storage medium of claim 18, wherein said creating at least one aggregation table ~~multiple aggregation groups~~ comprises creating at least ten partitions~~aggregation groups~~.

24. (Cancelled)

25. (Currently Amended) The computer-readable storage medium of claim 18~~24~~, ~~further comprising further instructions for performing steps comprising:~~

instructions for determining, upon receiving a request from the first ~~a~~ program thread for access to a partition~~an aggregation group~~, a system identifier for the first ~~requesting~~ program thread; and

instructions for assigning a partition ~~an aggregation group~~ identifier to the first ~~requesting~~ program thread based on the determined system identifier.

26. (Currently Amended) The computer-readable storage medium of claim 18, wherein:

~~each of the multiple database records corresponds to an instance of an organizational activity;~~

each of the multiple database records includes a field having a value indicating the corresponding instance to be in one of several process states, and

~~each partition aggregation group includes time-sorted aggregation records, each time-sorted aggregation record containing an aggregation value for instances in one of the several process states during a time period associated with the time-sorted aggregation record.~~

27. (Currently Amended) The computer-readable storage medium of claim 26, wherein one of said several process states comprises an instance being completed, and further comprising:

instructions for revising deleting aggregation values of the time-sorted aggregation records so as to exclude from said revised values the effects of records corresponding to instances completed outside of a preselected time window.

28. (Cancelled)

29. (Currently Amended) The computer-readable storage medium of claim ~~26~~<sup>28</sup>, further comprising further instructions for performing steps comprising:

instructions for deleting an aggregation record records from a partition the aggregated data table subsequent to a determination that indicating none of the multiple database records associated with said partition instances were in one of the process states during a time period corresponding to the deleted aggregation record.

30. (Cancelled)

31. (Currently Amended) The computer-readable storage medium of claim ~~26~~<sup>28</sup>, wherein the one of the process states corresponds to an instance being completed and wherein each of the multiple database records plurality of records includes a completion time field; and further comprising:



instructions for assigning a null value to the completion time field for database records corresponding to instances that are not completed;

instructions for assigning a non-null value to the completion time field for database records corresponding to instances in the completed process state.

32. (Currently Amended) The computer-readable storage medium of claim 3128,  
~~wherein data for each instance is maintained in an associated record of an instances data table,~~  
~~and further comprising:~~

instructions for determining if a record of the multiple database records of the instances data table has been updated;

instructions for revising, upon determining that the database instances data table record has been updated and based on said update, an aggregated aggregation value of one of the plurality of aggregation records;

instructions for further determining whether the updated database instances data table record contains a value indicating the corresponding associated instance is in the completed process state;

instructions for generating, upon determining that the corresponding associated instance is in the completed process state, a time of completion value for the instance; and

instructions for updating the one of the plurality of aggregation records a record of the aggregated data table based on the time of completion value for the instance.

33. (Cancelled)

34. (Currently Amended) A data processing apparatus for aggregating data from maintaining aggregations of values contained by fields of multiple database records in order to summarize information about multiple instances of an organizational activity, wherein each of the multiple database records corresponds to one of the multiple organizational activity instances, and wherein data within each of the multiple database records reflects an attribute of the organizational activity instance corresponding to that record, comprising:

at least one data storage device;

at least one user input device; and

a processor operatively connected to said storage device and said user input device, wherein the at least one data storage device has stored thereon a set of instructions which, when executed, configure said processor ~~to:~~ to

create at least one aggregation table representing multiple partitions~~aggregation groups,~~  
each partition group~~including a plurality of aggregation records,~~ each aggregation record  
including an aggregation a-value representing~~for an aggregation of values contained by fields of~~  
a distinct subset of the multiple database records;

select a first of the multiple partitions~~aggregation group~~ upon insertion or update of a  
first of the multiple database records, wherein said selecting is initiated in response to a request  
by a first program thread to access one of the multiple partitions;

update the aggregation value in at least one of the aggregation records in the first  
partition, wherein the updating is performed by the first program thread as part of a first partition  
update transaction, and wherein the first partition update transaction is~~revise,~~based on one or  
more values within the inserted or updated first database record~~and as part of a first aggregation~~  
~~group update transaction, the aggregation value of one of the aggregation records of the first~~  
~~aggregation group;~~

prevent other program threads from accessing~~subsequent selection of the first partition~~  
~~aggregation group~~ until the first program thread no longer requires access to the first partition  
~~aggregation group update transaction is completed;~~

select a second partition, while the first partition~~aggregation group~~ update transaction is  
being performed, wherein said selecting is initiated in response to a request by a second program  
thread to access one of the multiple partitions ~~and upon insertion or update of a second of the~~  
~~multiple database records, a second aggregation group; and~~

update the aggregation value in at least one of the aggregation records in the second  
partition, wherein the updating is performed by the second program thread as part of a second  
partition update transaction, wherein the second partition update transaction is~~revise,~~based on  
one or more values within the inserted or updated second database record, and wherein the  
second partition update transaction is performed during performance of the first partition

~~aggregation group update transaction, the aggregation value of one of the aggregation records of the second; and aggregation group.~~

~~aggregate aggregation values from the multiple partitions and output said aggregated aggregation values as a part of a summary of the multiple organizational activity instances.~~

35. (Currently Amended) The data processing apparatus of claim 34, wherein the set of instructions includes additional instructions which, when executed, configure said processor to:

~~select~~ selecting a third ~~partition aggregation group~~ upon initiation of a subsequent transaction to update the first of the multiple database records; and

~~reviserevising~~, based on one or more values within the subsequently updated first database record, the aggregation value of an aggregation record of the third ~~partition aggregation group~~.

36. (Currently Amended) The data processing apparatus of claim 34, wherein ~~aggregating aggregation values comprises the set of instructions includes additional instructions which, when executed, configure said processor to:~~ combining the multiple ~~partitions aggregation groups~~ into a single table of aggregation records, each record of the single table aggregating values of an aggregation record from each of the multiple ~~partitions aggregation groups~~.

37. (Cancelled)

38. (Currently Amended) The data processing apparatus of claim ~~34~~<sup>37</sup>, wherein the set of instructions includes additional instructions which, when executed, configure said processor to:

~~determinedetermining~~, upon receiving a request from ~~the first~~ a program thread for access to a ~~partition aggregation group~~, a system identifier for the ~~first requesting program thread~~; and

assign a partition assigning an aggregation group identifier to the first requesting program thread based on the determined system identifier.

39. (Currently Amended) A data processing apparatus of claim 34, wherein for maintaining aggregated data regarding multiple instances of an organizational activity, each instance of the activity having one of a plurality of process states, comprising:

each of the multiple database records includes a field having a value indicating the corresponding instance to be in one of several process states, and

each partition includes time-sorted aggregation records, each time-sorted aggregation record containing an aggregation value for instances in one of the several process states during a time period associated with the time-sorted aggregation record.

at least one data storage device;

at least one user input device; and

a processor operatively connected to said storage device and said user input device, wherein the at least one data storage device has stored thereon a set of instructions which, when executed, configure said processor to:

create a plurality of records in an aggregated data table, each record containing an aggregated value for a subset of the multiple instances in the same process state during the same time period, and

update the aggregated data table to reflect deletion of data corresponding to instances in one of the process states outside of a preselected time window.

40. (Currently Amended) The data processing apparatus of claim 39, wherein the set of instructions includes additional instructions which, when executed, configure said processor to:

revise the aggregation values of the time-sorted aggregation records so as to exclude from said revised values the effects of records corresponding to instances completed outside of a preselected time window delete records from the aggregated data table indicating none of the multiple instances were in one of the process states during a time period corresponding to the deleted record.

41. (Cancelled)

42. (Currently Amended) The data processing apparatus of claim 39, wherein the one of the process states corresponds to an instance being completed, wherein each of the multiple database records ~~plurality of records~~ includes a completion time field, and wherein the set of instructions includes additional instructions which, when executed, configure said processor to:

assign a null value to the completion time field for database records corresponding to instances that are not completed, and

assign a non-null value to the completion time field for database records corresponding to instances in the completed process state.

43. (Currently Amended) The data processing apparatus of claim 42, ~~wherein data for each instance is maintained in an associated record of an instances data table, and~~ wherein the set of instructions includes additional instructions which, when executed, configure said processor to:

determine if a record ~~of the multiple database records of the instances data table~~ has been updated;

revise, upon determining that the database instances data table ~~record~~ has been updated and based on said update, an ~~aggregated aggregation~~ value of one of the plurality of aggregation records;

further determine whether the updated database instances data table ~~record~~ contains a value indicating the corresponding associated ~~instance~~ is in the completed process state;

generate, upon determining that the corresponding associated ~~instance~~ is in the completed process state, a time of completion value for the instance; and

update the one of the plurality of aggregation records ~~a record of the aggregated data table~~ based on the time of completion value for the instance.

44. (Cancelled)

45. (New) A method for providing aggregations of values contained by fields of multiple database records, comprising:

- receiving data at a database relating to multiple instances of organizational activity;
- creating multiple instance records in the database, each instance record corresponding to an instance of organizational activity;

- creating multiple partitions, each partition including a plurality of aggregation records, each aggregation record including an aggregation value storing an aggregation of values contained by fields of a distinct subset of the multiple instance records;

- selecting a first partition in response to one of an insertion, update, or deletion of a first instance record in the database;

- revising the aggregation value of one of the aggregation records in the first partition based on values from the inserted, updated, or deleted first instance record;

- preventing subsequent selection of the first partition until the revising of the aggregation value in the first partition is completed;

- while the revising of the aggregation value in the first partition is being performed, selecting a second partition in response to one of an insertion, update, or deletion of a second instance record in the database;

- revising the aggregation value of one of the aggregation records of the second partition, based on values from the inserted, updated, or deleted second instance record; and

- making the revised aggregation values available in response to a query relating to the organizational activity.

46. (New) The method of claim 1, wherein preventing other program threads from accessing the first partition comprises providing the first program thread with a virtual token corresponding to the first partition, and wherein possession of said virtual token is required to access said first partition.

47. (New) The computer-readable storage medium of claim 18, wherein preventing other program threads from accessing the first partition comprises providing the first program

thread with a virtual token corresponding to the first partition, and wherein possession of said virtual token is required to access said first partition.

48. (New) The data processing apparatus of claim 34, wherein preventing other program threads from accessing the first partition comprises providing the first program thread with a virtual token corresponding to the first partition, and wherein possession of said virtual token is required to access said first partition.